

DEPARTMENT OF AGRICULTURE, BENGAL.

ANNUAL REPORT

OF THE

KALIMPONG DEMONSTRATION FARM.

FOR THE

YEAR 1909-10.




CALCUTTA :

THE BENGAL SECRETARIAT BOOK DEPOT.

1910.

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## INTRODUCTION TO KALIMPONG DEMONSTRATION FARM.

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IN conjunction with the St. Andrew's Colonial Homes at Kalimpong the Bengal Government opened a Demonstration Farm at Kalimpong in April 1907 for the district of Darjeeling. The chief work so far at this farm has consisted in acquiring and fencing the land, laying out the area and erecting the necessary buildings. This work is now completed and the agricultural practices of this part of the Himalayas in the Bengal district of Darjeeling will now be tested and definite figures of the cost of cultivation of the chief crops of this tract with outturns per acre will be worked out.

The geological formation of this station in the extra-peninsular area, which is not represented on any of our other present agricultural stations in Bengal, is the Daling series of transition rocks. From analyses we find that in the hills we are dealing with soils totally different in composition to those of the plains of Bengal, where organic matter is very deficient in all cultivated areas.

The normal rainfall of the Kalimpong district is about 90 inches. Such heavy rainfall can only be supported by certain crops, because of the rapidity with which the water drains off these slopes and it is very remarkable that the maize crops thrives so well as it does, for it reaches a maximum that is seldom approached on the plains. Water-logging kills the maize plant, and one can only admire the provision of nature that facilitates the immediate drainage of the surplus water. On the other hand, for the paddy crop which delights in plenty of water, each terrace is embanked by little bunds to cause accumulation. The winter months from November to March are very dry and there is not sufficient natural moisture to ensure full crops. Accordingly potatoes and vegetables and *rabi* crops must be watered or irrigated if large crops are required.

A cropping scheme has already been drawn up for this farm and is given in this report.

Although we have not been at work very long at this station, we have already some interesting results to record. Jaunpur maize, which has given such excellent results on the plains, is quite unsuitable for the hills. This variety failed entirely in 1907 and 1908, when the local variety did exceptionally well.

The following interesting results were obtained in 1908-09:—

A. *Local maize*.—33 maunds 15 seers per acre. Grown on rice terraces—unmanured, and .77 acre in area; stalks not given.

B. *Buckwheat*.—  $\left\{ \begin{array}{l} 12 \text{ mds. grain} \\ 27 \text{ „ straw} \end{array} \right\}$  per acre.

C. *Juar*.—  $\left\{ \begin{array}{l} 11 \text{ mds. 24 seers grain per acre.} \\ \text{Straw not given.} \end{array} \right.$

D. *Wheat*.—  $\left\{ \begin{array}{l} 8\frac{1}{4} \text{ mds. per acre.} \\ \text{Straw 17 mds.} \end{array} \right.$

E. *Paddy*.—  $\left\{ \begin{array}{l} 20\frac{1}{2} \text{ mds. grain per acre.} \\ 32\frac{1}{8} \text{ „ straw.} \end{array} \right.$

F. The Horatius cornsheller (Montgomery Ward) has given very satisfactory results. (T. E. Thomson & Co., Calcutta. Rupees 6).

Shells—4.5 mds. of grains per hour.

$9\frac{1}{2}$  mds. grain from 20 mds. of cobs (with leaves round cobs).

In 1909 an outturn of  $37\frac{1}{4}$  maunds of maize per acre was obtained.

In addition to ordinary crops a thorough test will be made with English fruit trees to find out their suitability for the Kalimpong Hills, and seedlings of the most important trees have already been obtained from the Royal Nurseries, Maidstone, England. These will be properly treated and their progress year by year will be carefully recorded. At the end of this report two plates are given. These are a plan of the farm and a level section through the farm.

Mr. P. Goodwin, Superintendent in charge of the farm, has written the following report.

F. SMITH,

*Deputy Director of Agriculture, Bengal.*



ANNUAL REPORT OF THE DEMONSTRATION FARM,  
ST. ANDREW'S COLONIAL HOMES, KALIMPONG,  
FOR THE YEAR 1909-10.

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*Situation and History.*—Kalimpong is the head-quarters of the sub-division of Daling (a large Government estate), and the chief centre of Tibetan trade with bengal. On bazar days (Wednesdays and Saturdays), produce is brought in from a wide area. It is 38 miles from Siliguri station, Eastern Bengal State Railway, and 24 miles from Ghum, Darjeeling-Himalayan Railway.

The Demonstration Farm is situated on the easterly slope, about  $\frac{1}{2}$  to  $\frac{3}{4}$  of a mile below the bazar. A beginning was made to use it as an experimental station in April 1907. Some 24 acres of the land had been cultivated by the St. Andrew's Colonial Homes prior to this, while the remainder was not taken over till December 1907. The land was rough and made up of small irregular plots, with bamboos, trees, houses, etc., in unsuitable places. Much of the work of the first two years consisted in removing these, making roads and fences, and erecting boundary pillars and farm buildings. The ordinary crops of the district were cultivated and some experimental work done in growing jute and *juar* and comparing local varieties of rice, wheat, buck-wheat and maize with imported ones.

*Area, Elevation, etc.*—A survey of the farm was made and a level section taken last year at a cost of Rs. 136-0-6. The plots were numbered and the areas computed. The total area excluding *ghoras* is 60·78 acres, of which 9·54 acres are taken up with roads, houses, buildings, waste land and land under trees and bamboos, leaving 51·24 acres of cultivated land. Of this, 22·22 acres were under experimental cropping during the year under report, the remainder being partly cultivated with the ordinary crops, and partly given to the farm coolies on the half-crop system.

The cultivated land is divided into 69 plots, varying in size from a small fraction of an acre to over 3 acres. The quality of the soil is still very variable, but has become much more uniform during the three years since the farm was started. Much more remains to be done in this respect before anything like ideal conditions for experimental

work are obtained. Every year the washing of the finer soil from the steeper parts to the depressions is taking place, and in the hollows there is an accumulation of good soil to a considerable depth. Even soils which are practically uniform, and receive the same treatment do not give similar yields year by year, and it is infinitely more difficult to get approximate uniformity in sloping or undulating land than in flat land. It is therefore essential that experiments be conducted for a considerable number of years before results are obtained which can be considered definite and reliable, and no great reliance can be placed on the figures obtained by one experiment. In some cases, of course, the difference in yield is so decisive, that prolonged experiments are quite unnecessary. For example, in 1908-09 Jaunpur maize was tried against the local variety with very striking results. Two separate acres were taken on different parts of the farm and each divided into two plots for the two kinds of maize. The figures are here given:—

	Jaunpur maize.		Local maize.	
	Mds.	s.	Mds.	s.
Plot No. 1	...	4 0	27	24 per annum.
" " 2	...	3 32	28	0 " "

This experiment had been conducted the previous year with very similar results, but as the time of sowing was much later than the ordinary time in the district, it was considered necessary to give it another trial. The difference in the outturns as shown by the figures above is, however, so great that the experiment has been discontinued, and one has no hesitation in making the statement that Jaunpur maize is quite unsuitable to this district. But where the outturns only vary in a slight degree, there have to be taken into consideration liability to attack by insect and fungoid pests, power of resistance against being laid by wind or storm, and aptitude for early ripening although the figures of one or two years point to one variety being the better, personal observation may incline one to prefer the others and accordingly experiments for a number of years are needed before a really definite conclusion can be drawn.

The elevation of the farm is :—

		Feet.
Lower end	...	3,317
Buildings	...	3,693
Upper end	...	3,864



The *slope* is one of the most gradual in the district, and from this point of view and that of elevation, a better situation could hardly have been chosen for an experimental station in these hills.

The *level section* was taken through the length of the farm from top to bottom and shows an average gradient 1 in 5.

*Soil*.—Detailed analyses of average samples of soil and subsoil were made by Mr. Annett, the Officiating Imperial Agricultural Chemist, and a copy of his report is here given:—

				295—09.	296—09.
				Soil.	Sub-soil.
Insoluble silicates and sand	...	...	...	69·47	71·29
Organic* matter	...	...	...	8·06	6·51
Iron oxide ( $\text{Fe}_2\text{O}_3$ )	...	...	...	6·36	6·42
Alumina ( $\text{Al}_2\text{O}_3$ )	...	...	...	11·91	11·98
Phosphoric acid ( $\text{P}_2\text{O}_5$ )	...	...	...	·21	·12
Lime ( $\text{CaO}$ )	...	...	...	·16	·10
Magnesia ( $\text{MgO}$ )	...	...	...	·68	1·00
Potash ( $\text{K}_2\text{O}$ )	}	...	...	·89	·76
Soda ( $\text{Na}_2\text{O}$ )		...	...	·01	·06
Carbonic acid ( $\text{CO}_2$ )	...	...	...	2·25	1·76
Undetermined	...	...	...		
				100·00	100·00
* Containing nitrogen	...	...	...	·21	·12
Available phosphoric acid	...	...	...	·017	·007
„ potash	...	...	...	·028	·012

“The soil is remarkable, in that its reaction is acid. It is badly in need of dressings of lime. I should be interested to know what crops, if any, have been grown on this land, and what sort of a yield they give.”

*Meteorology*.—The following table shows the average rainfall for ten years at the Charteris Hospital, Kalimpong (half mile from farm) compared with the fall for 1909-10. The rainfall for April, May and

June 1909 is also included. A rain-gauge has been procured and a register kept on the farm since June 1909 :—

Month and year.			Normal rain-fall, Charteris Hospital.	1909-10, rain-fall, Charteris Hospital.	1909-10, rain-fall, Demonstration farm.
1909.					
April	...	...	2.19	4.34	...
May	...	...	5.10	5.67	...
June	...	...	16.30	23.74	...
			23.59	33.75	...
July	...	...	22.95	25.27	29.46
August	...	...	20.09	20.30	22.36
September	...	...	11.15	9.12	9.84
October	...	...	2.78	5.53	5.43
November	...	...	.33	.02	.01
December	...	...	.37	.22	.21
1910.					
January	...	...	.38	.05	.06
February	...	...	.64	.17	.18
March	...	...	1.43	2.33	3.22
April	...	...	2.19	2.57	3.06
May	...	...	5.10	4.88	5.78
June	...	...	16.30	15.13	17.65
			83.71	85.59	97.26

The fall in April and June 1909 was very much in excess of the normal, while that of May was slightly more. There was no rain at all in March, and not sufficient till April 10th to start the germination of maize; so the crop was later than usual throughout the district. After germination, however, the weather was very favourable for its rapid growth, but owing to lack of sunshine the stalks were weak and during the heavy storms and wind of June and July much more than usual was blown down or broken off. The season was a specially favourable one for rice and the outturns were considered record ones by the cultivators. The heavier fall in October was also favourable for the beginning of the winter crops such as buckwheat, wheat, &c., though little rain fell after this. The fall in April, May



and June 1910 needs no comment, as it has no influence on any of the crops reported on in this account.

The difference of 12 inches for the year between the rainfall at Charteris Hospital and that of the farm itself is rather remarkable.

*Buildings.*—The new buildings were completed and occupied in August and September 1908.

The *godown* is a two-storied building having two rooms below, each 25'  $\times$  20 $\frac{3}{4}$ ' with cemented floor and one 52'  $\times$  21 $\frac{1}{4}$ ' above. One of the lower rooms is partitioned off along one side into six wooden cubicles for storing grain and there are ten galvanized iron seed bins. The upper room is fitted with a large cupboard for small tools and shelves for seed boxes, &c.

There is a small lean, to *toolshed* by the godown for tools in daily use. The *byre* will hold eight pairs of bullocks which stand tail to tail with a five-foot passage down the centre. It is 32 feet long by 21 feet wide. The width of each stall for one pair of bullocks is 8 feet, and the depth is also 8 feet, of which about 18 inches are taken up by the earthenware trough. The floor except the passage (which is of stone and cement) is made of sleeper ends set in with pitch, which provides very comfortable and warm lying for the bullocks. The drainage from the *byre* runs into the *manure pits* which are three in number, each 22 feet by 12 and 5 $\frac{1}{2}$  feet deep with cemented floor and walls. The roof is supported on pillars 5 feet above the walls. Water is laid on to the yard by pipes from a spring higher up.

The following shows the cost of each part of the work :—

			Rs.	A.	P.
Godown	...	...	...	3,590	0 9
Manure pits	...	...	...	2,009	15 3
Byre	...	...	...	1,559	14 6
Water-supply	...	...	...	127	6 0
Cutting site and levelling yard			...	470	12 3
Dry stone embankment	...	...	...	434	13 6
Drains	...	...	...	50	0 0
Total			...	8,242	14 3

Of this sum, Rs. 7,000 were given by Government, the Homes supplying the balance of Rs. 1,242-14-3. A rice-hulling machine with house

of bamboo and thatch was put up in January 1910 at a cost of Rs. 20-12.

*Terracing.*—To compare the results of terraced land with the ordinary slope, one acre was terraced last year at a cost of Rs. 96-3-6, a further sum of Rs. 11-2 being expended in improving the terraces in February 1910. A second acre of ordinary slope has been measured off next to this. Both plots were originally of fairly uniform slope and the soil as similar as could be got, and both are being treated in the same way. Equal amounts of manure and seed are applied to each, and the crops planted on the same day when possible. The labour of the two plots will of course vary somewhat.

The results of the first year's experiments (maize followed by buckwheat) are given below :—

TERRACED ACRE.						UNTERRACED ACRE.						
Outturn.			Cost of cultivation.			Outturn.			Cost of cultivation.			
Mds. s. Rs. A. P.						Mds. s. Rs. A. P.						
rop—						Crop—						
Maize-Grain			20	36	...	Maize-Grain			30	17	...	
Straw			97	32	27 10 9	Straw ...			143	36	33 11 9	
Buckwheat—						Buckwheat—						
Grain			...	5	15	Grain			...	10	0	
Straw			...	18	14	16 14 6	Straw			...	31	34 20 0 0

It will be seen that the outturn in the case of both crops is much larger from the untterraced plot. This is, of course, to be expected the first year, as half of each terrace is newly exposed sub-soil, which will not get mellowed until it has had time to become thoroughly disintegrated and oxidized.

The lower cost of cultivation on the terraces is accounted for, partly by less expense being incurred in dealing with a smaller crop and partly by the fact that there were few or no weeds on the inner halves of the terraces. As the terraces were made just before the time for ploughing for maize, the cost of this operation also was much less than on the untterraced plot.

*Implements.*—*Lakeside Fanning Mill* (\$ 11.50, Chicago).—This machine has been a very great boon for winnowing all grains. It does the work much quicker than by hand, takes out stones and generally makes a much better sample. Two hundred and ninety maunds of *bhutta* were put through the fan in five hours by nine hands (18th March 1910). For rice cleaning it is specially good. The ordinary method employed here is as follows:—After the rice has been threshed out by making



sheaves and beating them on the threshing-floor and the straw has been trampled by bullocks, the grain is collected into a heap. A place is then swept clean and one man takes up a little in a small round tray (*nanglo*), and spreads it thinly over the ground by a dexterous twist. Three or four hands then blow out the chaff and dust by fanning the heap with the trays. Any straws that may be left in, and stones have to be picked out by hand. It is rather a slow process, and the advantage of using a machine is shown by the following figures:—

				Mds.	s.
With Lakeside Fanning Mill, three hands cleaned					
in half an hour	...	...	...	18	2
By ordinary method, four hands cleaned in half an					
hour	...	...	...	8	33

*Kodo*, wheat, *dal*, etc., are usually winnowed with fanning trays, each coolie taking up a little and fanning out chaff and dust by rapid movements of the *nanglo*. This work is nearly always done by the women, very few of the men having the special art required for producing the peculiar movements on the *nanglo* required to separate the grain.

For *kodo* a special kind of *nanglo* is used with meshes for the grain to fall through. By using the winnowing machine much time was saved. The machine was a great attraction to the natives who passed by on the road near the buildings and many of them came on to the threshing-floor to watch.

*Horatius Corn Sheller* (\$1.50, *Chicago*).—We have two of these small shellers which are fixed on the sides of a shallow raised box, the cobs are placed in the box and then passed through the shellers. Practically all the maize was extracted by the machines except the very small and broken cobs. The best method of hand shelling is by knocking off the grains with the backs of sickles. The difference in the two methods is here shown:—

				Mds.	s.
With shellers, four hands shelled in half an hour	...	...	...	2	20
With sickle	...	...	...	1	35

*Rice Huller*.—The native implement (called here a *dhiki*) is made by fixing two strong pieces of wood in the ground and fastening between them a long beam with a pivot attached 2 feet from one end and 7 from the other. About 18 inches from the longer end on the

under side a small piece of wood, about a foot long tipped with an iron ring, is fixed into a hole made in the beam. This plug fits into a hole 6 inches deep made in a large stone on the floor of the house and into the hole the rice to be husked is placed. Two hands are required to work the beam by placing their feet on the short end, and one coolie keeps the rice under the plug and cleans it as it is finished. The cost of preparing the husked rice from one maund is about four annas, three hands being usually able to husk three maunds per day.

*Crops.*—Maize and rice are the most important crops in the district. Nearly all the untterraced arable land is put under maize, a little dry rice (*ghaiya*) being grown and occasionally one may see small plots of sugarcane from which the cane is sold in the bazars for chewing, or used for the manufacture of *gur*. *Kodo* is transplanted on most of the maize land before the maize is harvested, while buckwheat, *dal* and Soy beans are frequently grown. Wheat, barley and mustard are occasionally seen, but these crops are not grown to any extent. After rice as a rule nothing is grown, as there is not often sufficient moisture in the soil for germination and very little can be brought from the *ghoras* at that time of the year (December). On the lower elevations maize is sometimes grown on the terraces for fodder before the rice is transplanted. *Dal* and Soy beans are sometimes dibbled in on the raised banks (*alis*) of the terraces.

*Maize.*—The season was not a good one, on the whole, for this crop. All the maize on the farm was sown from 9th to 23rd March 1909, but there was not sufficient rainfall to start germination till 10th April, consequently the crop was rather late. It grew rapidly when once up and did not suffer much from caterpillars which do great damage in dry weather by biting round the lower part of the stalk and causing it to break off. Owing, however, to the quick growth and to the lack of sunshine the stalks were rather weak, and during the heavy storms in June a good deal was blown down.

Twenty-five seers of seed were used per acre and the crop was thinned out.

Harvesting took place on the farm from 23rd August to 8th September.

The cobs were stacked outside on bamboo *machans* with the exception of the small and damaged ones.

Twenty acres of maize were grown, the total weight of cobs as carried in with leaves attached being 910 maunds 12 seers and the



weight of grain 430 maunds 24 seers, which gives 47·3 per cent. of grain from the cobs with leaves as harvested.

The half crop maize was 18 maunds 16 seers, which gives a total of 489 maunds.

The yield per acre from 20 acres was 21 maunds 21 seers.

Eleven acres were under experimental cultivation, total outturn, average outturn per acre, etc., are shown by the following table :—

Area.	Outturn.	Value.	Cost of cultivation.	Profit.
Acres.	Mds. s.	Rs. A. P.	Rs. A. P.	Rs. A. P.
11	280 18	595 12 10	295 15 6	299 13 4
1	25 20	54 2 9	26 14 6	27 4 3

The value of grain is calculated Rs. 2·2 per maund; nothing is put down for the stalks.

Five varieties of local maize were tried on one-acre plots with the following results. Fifty maunds of manure was applied per acre :—

Variety.	Outturn.
	Mds.. s.
Round yellow	... 19 12 (average of two plots).
Flat „	... 37 13
Round white	... 26 32
Flat „	... 28 8
Red	... 19 30

The manure experiment on maize gave the following results :—

Round yellow maize was sown on one-acre plots.

Manure,	Outturn.
	Mds. s.
1. 100 maunds farmyard manure	} 28 32
2 maunds superphosphate ...	
2. 100 maunds ...	... 27 17 (average of two plots).
3. Unmanured ...	... 25 8

Full details of the cultivation of the acre of maize giving best outturn are here shown :—

Date.		PARTICULARS.		Cost.		
				Rs.	A.	P.
1909.						
February	16--18	Ploughing (five teams)	...	3	2	0
"	18--19	50 maunds manure cartage and spreading.		4	11	0
"	20 ...	Breaking clods with <i>kodalis</i> , digging corners, etc.		1	1	0
March	18 ...	Seed 25 seers, flat yellow	...	1	9	0
"	18 ...	Ploughing in seed (three teams)		1	14	0
"	18--20	Breaking clods with <i>kodalis</i> , etc.		2	3	0
May	22 ...	Hoeing, weeding and thinning		4	1	0
June	22 ...	Hoeing and weeding	...	3	4	0
September	6 ...	Harvesting, carrying and stacking.		6	7	3
December	6 ...	Shelling cobs	...	0	3	0
February	23 ...	Getting off leaves and shelling cobs.		1	12	0
					30	3 3
37 maunds 13 seers grain at Rs. 2-2				...	79	5 0
Profit				...	49	1 9

*Rice.*—The year was an exceptionally good one for this crop, the rains commencing early, and being considerably over the average. 10·40 acres were grown, detailed reports of the whole of which were kept in the cultivation book.

		Mds.	s.
The total yield was	... {	Grain	210 14
		Straw	403 0
6·45 acres were cultivated on half crop			
system giving produce to the farm of.	{	Grain	65 20
		Straw	77 0
which gives a total of	... {	Grain	275 34
		Straw	480 0

The following table shows total and average outturns, cost of cultivation, etc., on 1040 acres:—

AREA.	OUTTURN.		VALUE.	Cost of Cultivation.	Profit.
	Grain.	Straw.	Grain, Rs. 2-8 Straw As. 7		
	Mds. s.	Mds. s.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1040 acres	210 14	403 0	702 4 0	479 5 9	222 13 3
1 acre ...	20 9	38 30	67 8 0	46 1 5	21 6 7

The average profit of Rs. 21-6-7 per acre is rather less than that for maize, Rs. 27-4-3.

*Manure experiment on rice.*—The result is shown in following table:—

MANURE.	OUTTURN.			
	Grain.		Straw.	
	Mds.	s.	Mds.	s.
No manure ...	27	31	43	14
50 maunds farmyard manure ...	25	0	40	38
Green manuring, <i>dhaincha</i> ...	21	12	23	30

This experiment was tried on one acre plots, but it is impossible to obtain plots of this size of uniform character.

The unsatisfactory character of this experiment is due to the difference in quality of soil, which is to a great extent influenced by irrigation, the quantity of sediment in the water depending on the source from which the water is obtained. The surface water containing the washings from the bazar is very different from that issuing from springs.

For 1910-11 one-acre of fairly uniform and rather poor land has been selected and divided into three plots, and the results should be more satisfactory next year.



*Variety experiment.*—Five kinds of rice were tried on  $\frac{1}{2}$  acre plots manure at the rate of 50 maunds per acre being applied to each. The results are here shown :—

		OUTTURN PER ACRE.			
		Grain.		Straw.	
		Mds.	s.	Mds.	s.
1. Touli hill rice	...	15	38	31	37
2. Danase ditto	...	20	6	39	2
3. Krishnabhog ditto	...	10	0	55	0
4. Maharajwa plains rice	...	14	0	50	0
5. Badshabhog ditto	...	2	24	61	0

Krishnabhog is a fine rice usually grown at lower elevations.

Nos. 1 and 2 were sown on 5th June, No. 3 on 4th June and the two plains varieties on 1st June, and while Nos. 1 and 2 were cut on 10th November, Nos 3 and 4 were not cut till 27th November and badshabhog was not ripe enough to cut till 10th December. The long period required to ripen in the case of Nos. 3, 4 and 5 resulted in their having an insufficient supply of water in the later stages. The large outturn of straw in the case of the last three is noteworthy.

Badshabhog will be discontinued and three more local varieties added for the 1910-11 experiment.

The following table shows the comparative yields of three local varieties :—

VARIETY.		Acreage.	OUTTURN PER ACRE.			
			Grain.		Straw.	
		Acres.	Mds.	s.	Mds.	s.
1. Touli	...	3.18	24	7	35	31
2. Danase	...	3.90	20	25	40	1
3. Mansara	...	2.57	17	39	35	10

Compared with the result of the last experiment the places of Touli and Danase are reversed. Both are very popular varieties, and are generally considered of equal merit by the cultivators. Mansara is not grown to the same extent, and does not give good results on very rich land.

The following table shows the amount of table rice from one maund dhan of five varieties :—

			Seers.
Touli	...	...	28
Danase	...	...	27
Mansara	...	...	21
Krishnabhog	...	...	22
Maharajwa	...	...	22

To show details of cultivation, dates of sowing, harvesting, etc., the report of one acre from the cultivation book is appended.

Field No. 102.—Area 1 acre, unmanured. Variety touli (local coarse).

Date.	PARTICULARS.			Rs.	A.	P.
1909.						
May 17th	...	Ploughing seed-bed	...	0	6	0
„ 18th—20th	...	Preparing seed-bed and sowing	...	1	0	0
„ 20th	...	1 maund seed	...	3	0	0
June 10th—12th	...	Ploughing (5 teams)	...	3	2	0
„ 15th—16th	...	Cutting weeds from <i>alis</i> (banks of terraces).	...	4	4	0
July 2nd—6th	...	Ploughing in water ( $4\frac{1}{2}$ teams)	...	2	13	0
„ 2nd—6th	...	Building up <i>alis</i> (to keep in the water).	...	2	12	0
„ 5th—7th	...	Mixing soil and water and levelling with <i>dhande</i> (2 teams).	...	1	4	0
„ 5th—7th	...	Levelling with <i>phawri</i> (hand leveller) and <i>kodalies</i> .	...	1	14	0
„ 5th—7th	...	Getting out seedlings and transplanting.	...	3	6	0
August 17th—20th	...	Hand weeding	...	10	6	0
November 5th	...	Cutting	...	3	7	6
„ 10th	...	Tying up, carrying and stacking	...	3	11	0
December 23rd—24th	...	Threshing, winnowing, tying up straw and stacking.	...	3	4	0
	...	Watering (for whole period)	...	3	0	0
				47	9	6

Date, 1909.	PARTICULARS.	Rs. A. P.			Rs. A. P.		
		Rs.	A.	P.			
	27 mds. 31 seers grain @ Rs. 2-8=	69	7	0			
	43 „ 14 „ straw @ As. 7=	18	15	6			
		<hr/>			88	6	6
	Profit	...	40	13	0		
		<hr/>					

*Jute*—Was tried on  $\frac{1}{4}$ -acre plot, but did very badly, giving a yield at the rate of only 2 maunds 8 seers per acre. *Jute* has been tried for three years, but its cultivation has now been discontinued.

*Juar*—Is not grown much in this district. I have only once seen it at all, and then there were only a few plants grown near the cultivator's house. There is practically no sale for the grain. Local *juar* was tried against plains *juar* in 1907-08 and 1908-09; the first year the local variety proved much superior and the second year the plains variety quite failed.

One-fourth acre of local *juar* was grown during the year under report and gave an outturn at the rate of—

			Mds.
Grain	...	...	14
Straw	...	...	94

The yield of grain compared with maize is very poor, while the cost of cultivation is much the same. Moreover, as the *juar* does not ripen till December, it does not permit of another crop being taken from the same land.

*Wheat*—Is cultivated here only to a small extent as a second crop after maize.

Local wheat was tried against Muzaffarnagar wheat on acre plots with the following results :—

		Grain.		Straw.	
		Mds.	s.	Mds.	s.
1. Local wheat	...	4	14	9	32
2. Muzaffarnagar wheat	...	11	0	12	0

The local kind was somewhat damaged by trespass. Another plot of the local kind, 0·8 acre in extent (consisting of old rice terraces which had become very rich by irrigation deposits and on which rice growing had been discontinued owing to the tendency of the straw to be laid), gave an outturn at the rate of 12 maunds 38 seers per acre. The Muzaffarnagar wheat is much superior in quality and appearance, the local kind having very small grains. This is about the only



introduced crop which has compared at all satisfactorily with the local variety. Both kinds will be tried this year on  $\frac{1}{2}$ -acre plots side by side

Details of cultivation of wheat are given :—

Field No. 156, 1 acre.

Variety, Muzaffarnagar, unmanured.

Date.	PARTICULARS.	Rs.	As.
September 28th ...	Clearing off maize stalks and weeds	4	5
October 6th ...	Ploughing (four teams) ...	2	8
„ 6th ...	Levelling weeds ...	0	4
„ 7th ...	Sowing, breaking clods, digging corners, etc.	0	12
„ 7th ...	Levelling with log (1 pair bullocks)	0	10
„ 7th ...	Seed 2 maunds ...	7	8
March 14th ...	Cutting and carrying ...	3	4
„ 25th-28th ...	Threshing and winnowing	8	10
		<hr/> 27 13 <hr/>	

	Rs.	As.
Grain 11 maunds @ Rs. 3-6 =	37	2
Straw 12 „ @ An. 1 =	0	12
	<hr/> 37 14 <hr/>	
Profit	...	10 1
	<hr/> 10 1 <hr/>	

*Barley*—Does not succeed here and is very little grown by the people.

One acre of the local variety gave an outturn of 3 maunds 13 seers which valued at Rs. 10 is much less than the cost of cultivation, viz., Rs. 24-12.

*Uwa*—Did worse than barley, the yield from an acre being only 1 maund. Two maunds of seed per acre was used for both this crop and for barley. During the dry weather except in the depressions most of the plants died off.

Some of the local cultivators after trying *uwa* for a year or two have given up cultivating it.

*Buckwheat*—Occupies the land only about three months, being sown in September as soon as possible after the harvesting of maize and ripening in December. Small areas are grown throughout the district, but it is looked upon as a very exhausting crop, and for this reason is not extensively cultivated. Some land-owners when letting out their land on half-crop system prohibit the growing of buckwheat. The cost of cultivation is probably less than that of any other crop, being

Rs. 18-7-3 as the average of 2 acres, and if sown early enough, it is a fairly sure crop.

Buckwheat was grown on the land for the terracing experiment and the outturns from the terraced and unterraced acres are given under the heading "Terracing," but for convenience detailed particulars are given lower. Buckwheat requires to be harvested before it gets very ripe, as it sheds very easily; it is usually carried and threshed immediately after cutting, as much is lost if it is kept on the field to dry the grain is spread out in the sun to dry before storing. The straw is of little value, but may be used for bedding cattle. Details of cultivation:—

*Buckwheat, local.*

Date.	FIELDS NOS. 140 AND 142, 1 ACRE UN TERRACED.		Date.	FIELD 139, 1 ACRE TERRACED.	
	Particulars.	Rs. A. P.		Particulars.	Rs. A. P.
4th-6th September 1909.	Cutting and carrying off maize stalks.	4 1 0	6th-7th September 1909.	Cutting and carrying of maize stalks.	2 14 0
10th-11th September 1909.	Cutting weeds ...	2 11 0	10th-11th September 1909.	Cutting weeds ...	1 14 0
14th September 1909.	Ploughing 4 teams	2 8 0	13th September 1909.	Ploughing 4 teams	2 8 0
14th September 1909.	Levelling weeds ...	0 4 0	13th September 1909.	Levelling weeds ...	0 4 0
17th September 1909.	Sowing and hoeing in seed.	2 6 0	17th September 1909.	Sowing and hoeing in seed.	2 6 0
	30 seers seed ...	1 14 0		30 seers seed ...	1 14 0
11th-13th December 1909.	Cutting, carrying, threshing and winnowing.	6 4 0	13th, 14th, and 22nd December 1909.	Cutting, carrying, threshing and winnowing.	5 2 6
		20 0 0			16 14 6
	Mds. s.			Mds. s.	
Grain ...	10 0		Grain ...	5 15	
	Rs. A. P.			Rs. A. P.	
	@ Rs. 2-4 = 22 8 0			@ Rs. 2-4 = 12 1 6	
	Mds. s.			Mds. s.	
Straw ...	31 34		Straw ...	18 14	
	@ A. 1 = 1 15 9			@ A. 1 = 1 2 3	
		24 7 9			13 3 9
	Profit ...	4 7 9		Loss ...	3 10 9

*Kodo* is next to maize and rice the most widely cultivated crop in the district. The grain is used as food by the people, who also brew a mild drink, *marwa*, from it. It is also given to cattle and pigs. If the plants are not damaged when very small in the seed-bed by heavy rain, a crop is pretty certain, but the cost of cultivation is excessively high compared with the value of the outturn. Transplanting is very slow work, as is the subsequent hand-weeding; harvesting also takes a long time; and it is surprising that its cultivation should continue to be popular; many of the cultivators frankly acknowledge that it often does not pay them full wages for their own labour, but philosophically add that it provides them with food later on.

The area cultivated by the farm this year was 3.27 acres, which gave a total outturn of grain of 64 maunds 20 seers or 19 maunds 29 seers per acre. The straw is sometimes cut and sold to mule-owners if the distance from the bazar is not too great, but generally it is left on the ground and grazed. Cultivators who have *kodo* land by the roads often let it after the *kodo* is harvested to Thibetan traders as camping ground for mules for the benefit of the manure.

Details of cultivation of one acre are given:—

Date.	PARTICULARS.	Rs. A. P.
1909.		
12th May—1st June ...	Digging seed-bed and sowing ...	1 8 0
24th, 29th May ...	11 maunds manure for seed-bed...	1 0 6
1st June ...	12 seers seed ...	0 12 0
1st-2nd July ...	Weeding seed-bed ...	0 8 0
13th July, 2nd Aug. ...	Hoeing ground, pulling up and burying weeds ...	7 13 0
13th „ 2nd „ ...	Getting out seedlings, carrying and transplanting ...	18 12 6
9th-10th September ...	Cutting and carrying off maize stalks ...	4 4 0
21st-22nd „ ...	Hand weeding ...	12 14 0
23rd-25th November ...	Plucking and carrying ears ...	11 15 0
25th Nov., 6th Dec. ...	Threshing and winnowing ...	2 4 6
6th-7th December ...	Cutting and carrying straw ...	4 5 0
		<hr/> 66 0 6
	Mds. s. Rs. A. P.	Rs. A. P.
Grain ...	21 0	
	@ Rs. 2-3 =	45 15 0
	Mds. s.	
Straw ...	39 32	
	@ As. 3 =	7 7 3
		<hr/> 53 6 3
Loss ...		12 10 3



I should doubt if the value of the crop ever exceeds the cost of growing it. It would not appear to exhaust the soil very much, crops of maize followed by *kodo* being taken from the same ground year after year.

*Dal*—Is grown fairly extensively, being next to *kodo*, probably the most widely cultivated secondary crop.

It is sown among the maize in July or beginning of August, after the land has been hand-weeded and the weeds buried, and is hoed in with *kodalies*. After the harvesting of the maize the stalks are cut and carried off, from 2—3 feet of stalk being left. The crop is hand-weeded once and the weeds often tied on to the maize stalks. (This is the case also with *kodo*.)

When harvested it is generally pulled up by the roots or broken off instead of being cut. The weeding is the most expensive item of cultivation, which amounted to Rs. 31-5 on one acre.

			Mds.	s.
The outturn was				
Grain	...	...	7	28
Straw	...	...	8	20

The average price of *dal* in the bazar is Rs. 3-12 per maund. This yield was not a very good one and better results are hoped for next year.

*Soy bean*—Is grown more on the higher elevations where *dal* will not thrive, its cultivation is similar to that crop except that it is sown a little earlier. I have collected six different samples of the bean [called here *Bhatmas* (Nepali) and *Selliyang* (Lepcha)], but only one or two are much grown. Most lots of *Bhatmas* contain some seeds of three or four varieties. The bazar price of *bhatmas* is Rs. 3-2 per maund.

One-third acre was cultivated by the farm, giving a yield at the rate of—

		Mds. s.	
Grain	...	...	5 13 per acre.
Straw	...	...	6 18 ,,

The crop was rather thin owing to damage by excessive rain just after germination.

*Gram*—Is not grown in this district. Half an acre was tried on the farm on rice terraces after the harvesting of the rice. The

seed was sown from 13th to 29th December, ploughing being delayed owing to lack of water. It ripened unevenly and only a few terraces were harvested on 2nd and 25th June, the remainder had to be ploughed in. It suffered considerably from the ravages of a caterpillar which ate the grains in the pod. Moths were reared from the caterpillars, and one was sent to the Imperial Entomologist who identified it as *Chloridea obsoleta* or *Heliothis armifera* (older name). From the amount that was harvested only 16 seers of grain were got, which was of inferior quality. Fifteen seers of seed was used for the half acre. It is evident even after one year's trial that it cannot be successfully cultivated after rice, as the sowing is then much too late. Next year it is intended to try a small area after maize. This would enable the seed to be sown two or three months earlier.

*Oats*—Which I have never seen growing in Kalimpong, were tried on  $\frac{1}{4}$  acre. The outturn was at the rate of—

			Mds.	s.	
Grain	...	...	5	28	per acre.
Straw	...	...	35	8	„

This is rather a poor yield, the cultivation is similar to that for wheat. The crop, however, ripened very late and was not harvested till 25th and 26th April, which delayed the sowing of maize on that plot.

*Fruit*.—Oranges, pineapples, papayas, limes and bananas grow well here. Plums, pears and peaches are also cultivated. The plums are often of quite good flavour, but the quality of the pears and peaches is inferior, as is that of the mangoes and lichis in this district.

The orange is the most important crop, but the season under report was an exceptionally bad one. In 1908-09 oranges to the value of about Rs. 60 were sold from the farm, but this year the income was nothing.

One hundred and fifty-eight English fruit trees were ordered by the Hon'ble Mr. Oldham, when Director of Agriculture, from Messrs. Bunyard & Co., of Maidstone, Kent, and arrived here on 31st December 1909. They were put into a nursery and shaded and the largest kinds planted out during the monsoon, while the remainder were moved in June 1909.

The following list gives the number of trees received and number living on 30th June 1910 under each variety :—

Name of tree.		Number imported.	Number living, 30th June 1910.
Apples	...	12	8
Apricots	...	12	5
Nectarines	...	6	1
Plums	...	24	11
Cherries	...	18	7
Peaches	...	6	...
Pears	...	18	4
Walnuts	...	6	6
Figs	...	6	5
Vines	...	6	3
Gooseberries	...	12	...
Currants	...	12	...
Raspberries	...	20	...
		158	50

This is not very encouraging, but some of the kinds are quite unsuitable for this climate.

*Accounts.*—A copy of the balance sheet for the year ending 31st March 1910 is here given :—

RECEIPTS.			EXPENDITURE.		
	Rs.	A. P.		Rs.	A. P.
To Government grant ...	5,000	0 0	By debit balance from 1908-09.	...	26 13 4
„ sale of produce ...	1,642	12 0	„ weekly wages ...	1,433	15 6
„ hire of bullocks ...	68	12 0	„ monthly wages ...	928	9 6
„ trespassing fines ...	27	1 0	„ Superintendent ...	3,237	8 0
„ other miscellaneous receipts ...	3	5 0	„ establishment ...	...	5,600 1 0
„ amount paid by Homes for cost of survey.	83	0 6	„ cost of survey ...	...	83 0 6
„ amount paid by Homes for rent of farm for two years.	140	2 0	„ manures ...	...	26 13 3
			„ implements, tools, etc.	...	112 13 3
			„ stationery ...	...	11 11 0
			„ salt, oil and sundries ...	...	22 7 8
			„ bullocks ...	...	80 0 0
			„ seeds ...	...	24 3 6
			„ value of half produce paid to Homes for 1908-09.	329	7 8
			„ value of half produce paid to Homes for 1909-10.	821	6 0
			„ shipping and railway freight and car.	...	1,150 13 8
			„ rent of farm ...	...	22 3 0
			„ petty cash and postages.	...	70 1 0
„ debit balance ...	285	13 9		...	20 0 0
Total	7,251	1 3	Total	7,251	1 3



*Valuation.*—The farm stock as on 31st March 1910 was valued by Mr. A. Dennis Hickley, a copy of whose valuation is appended.

	Rs.	A.	Rs.	A.
Implements ...	...	...	667	9
10 bullocks ...	...	...	270	0
Rice ...	...	556 14		
Do. straw ...	...	37 8		
Kodo ...	...	193 0		
Buckwheat ...	...	44 10		
Dal ...	...	11 4		
Bhatmas ...	...	4 8		
Juar ...	...	7 8		
Jute ...	...	1 8		
Maize ...	...	74 6		
Wheat ...	...	75 0		
Barley ...	...	8 2		
Uwa ...	...	3 0		
Oats (growing) ...	...	10 0		
Linseed ...	...	10 0		
			1,037	4
Total ...			1,974	13

*Management.*—The land for the Demonstration Farm was bought by the St. Andrew's Colonial Homes and is subject to an annual rent of Rs. 70-1. Government gives a yearly grant of Rs. 5,000 to help in carrying on the work. Half of the produce sold is paid to the Homes and the remainder goes to the working of the farm. The late Director of Agriculture, the Hon'ble Mr. Gourlay, inspected the farm on 6th July and 4th November 1909, and the present Director on 11th May 1910. The Deputy Director made two inspections, viz,—on 27th and 28th September 1909, and 30th April to 4th May 1910.

*Acknowledgments.*—I would like to express our thanks to Mr. Annett, Officiating Imperial Agricultural Chemist, for analyses of soil and subsoil, to the Imperial Entomologist for identifying insects, and to Mr. Hickley for his kindness in valuing the farm stock.

PERCY W. GOODWIN,

*The 26th July 1910.*

*Superintendent.*

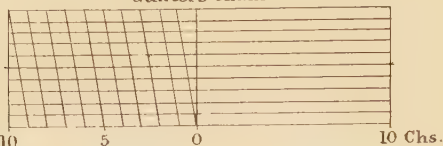


# MAP.

Showing the land belonging to St. Andrew's Colonial Homes  
Known as Demonstration Farm, Kalimpong.

Dongra Block No. 5, Kalimpong Sub Division, Darjeeling District.  
Area of Demonstration Farm 60.78 Acres.

Scale 32 Inches = 1 Mile.  
Gunter's Chain



## REFERENCES

- Road coloured thus.....
- Jhoras.....
- Building & Houses.....
- Boundary Pillars.....
- Land not belonging to  
Demonstration farm. }.....

## BOUNDARIES

- North by Government Raiyat's land and road to Nimbung.
- East by Government Raiyat's land & Jhora.
- West by Kalimpong Bazar Compounds and Block No. 5.
- South by Block No. 5 and Government Raiyat's Land.
- Surveyed by

(Sd.) Baktowar Singh  
Amin.





Level Section of Demonstration Farm Kalimpong

Horizontal Scale 480 Links to the inch.

Vertical Scale 96 feet to the inch.

feet

Highest of Lower End of Farm 3317.45

" " Buildings 3673.26

" " Upper End of Farm 3864.26

Endings















